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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Taiji Nishi

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ALEXANDRIA, VA 22314

EXAMINER

RAMDHANIE, BOBBY

ART UNIT

PAPER NUMBER

1797

NOTIFICATION DATE

DELIVERY MODE

05/29/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/806,456	Applicant(s) NISHI ET AL.	
	Examiner BOBBY RAMDHANIE	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34, 36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) 20-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19, 36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/05/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-19, 36 & 37 have been considered but are moot in view of the new ground(s) of rejection. The new grounds of rejection are necessitated by applicant's amendments to the claims.

Claim Objections

2. Claims 1-6, 8, 10, 14, 17, & 37 are objected to because of the following informalities: Applicant has amended the Claim 1 to include the new limitation, "to from the resist pattern." The Examiner believes there is a typographical error and this limitation is to mean, "to form the resist pattern." Appropriate correction is required.

Response to Amendment

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-4, 6, 7, 10, & 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (US6541187) in view of Chou et al (US5656414).
6. Applicants' claims are toward a process.
7. Regarding Claims 1, 2, 4, 7, & 17, Wang et al discloses the process of producing a resin molded product, comprising: A). Forming a resist pattern on a substrate (See Figures 21A-E); B). Forming a metal structure by depositing a metal in accordance with the resist pattern on the substrate (See Figure 21E Item 40j is the metal); and C). Forming a resin molded product by using the metal structure (See Figures 21E & F Item 50').
8. Wang et al does not disclose wherein the forming a resist pattern comprises: forming a plurality of resist layers on the substrate; and after the forming the plurality of resist layers, developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer to form the resist pattern.
9. Wang et al does however disclose that the single resist pattern that is formed on the substrate does have sections that are removed using solubility control (the developing of a photoresist is interpreted as using solubility control).
10. Chou et al discloses the use of a plurality of photoresist layers (See Column 6 lines 10-17) wherein the forming a resist pattern comprises: forming of a plurality of photoresist layers on the substrate (See Column 6 lines 10-17); and after the forming

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the plurality of resist layers, developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer to form the resist pattern (See Column 10 lines 47-49; the upper resist layer has a section that is insoluble than the lower resist layer & Figure 2).

11. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Wang et al with the plurality of photoresist layers and process of Chou et al because Wang et al discloses that the process can be used to develop positive or negative photoresist layers (See Column 3 lines 55-57).

12. Additional Disclosures Included: Claim 2: Wherein the solubility control comprises heat treatment control performed before the developing the plurality of resist layers for controlling an amount of heat-treatment of the lower resist layer and the upper resist layer (See Wang et al Figures 11 & 18 irradiation essentially gives off heat & Chou et al Column 6 lines 59-62 & Figures 3 & 4); Claim 4: Wherein the forming a resist pattern comprises: performing heat-treatment of the lower resist layer after exposure of the lower resist layer; and performing heat-treatment of the upper resist layer after exposure of the upper resist layer (See Chou et al Figures 3 & 4); Claim 7: A process of producing a resin molded product having an uneven surface used for material processing, comprising: forming a resist pattern on a substrate; forming a metal structure by depositing a metal in accordance with the resist pattern on the substrate; and forming a resin molded product by using the metal structure, wherein the forming a resist pattern comprises: forming a plurality of resist layers; after the forming the plurality of resist layers, developing a lower resist layer exposed with a mask pattern

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and an upper resist layer exposed with a mask pattern of the plurality of the resist layers, to form a resist pattern having a raised or recessed portion with a plurality of different heights; and developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer (See Claims 1-4); Claim 17: Wherein a height of a raised or recessed portion of a resin molded product formed by the forming a resin molded product is substantially 5 μm to 500 μm (See Chou et al; Column 6 lines 19-35).

13. Regarding Claim 3, the combination of Wang et al and Chou et al disclose the process of Claim 2, wherein forming a resist pattern comprises: performing heat-treatment of the lower resist layer before exposure of the lower resist layer (See Figure 3 the steps of 108 to 110).

14. The combination does not disclose performing heat-treatment of the upper resist layer before exposure of the upper resist layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform heat-treatment of the upper resist layer before exposure of the upper resist layer since it has already been disclose by Chou et al to be used to further change the surface of the lower resist layer.

15. Regarding Claim 10, the combination of Wang et al and Chou et al discloses the process of Claim 1, except wherein the forming a resist pattern further comprises depositing and exposing one or more resist layers after exposing the upper resist layer, to create a raised or recessed portion with two or more different heights.

16. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a resist pattern that further comprises depositing and

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exposing one or more resist layers after exposing the upper resist layer, to create a raised or recessed portion with two or more different heights as a design choice to depending on the stamp or molded product desired.

17. Regarding Claim 6, the combination of Wang et al and Chou et al disclose the process of Claim 1, wherein the lower resist layer and the upper resist layer are made of resist of which solubility in a developer changes by exposure and heat treatment, and forming a resist pattern comprises, before the developing the plurality of resist layers, exposing the lower resist layer (See Chou et al Column 4 lines 43-54) and performing heat treatment of the upper resist layer after exposing the upper resist layer (See Chou et al Figures 3 & 4 & Rejection to Claim 3).

18. The combination does not disclose depositing the upper resist layer without performing heat treatment of the exposed lower resist layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Wang et al and Chou et al with depositing the upper resist layer without performing heat treatment of the exposed lower resist layer to heat the plurality of layers at the same time as a means for reducing the number of processing steps since Chou et al already discloses that the developing step may be performed at the same time as a means for reducing the number of processing steps (See Chou et al Column 5 lines 15-20).

19. Claims 8, 9, 11-13, 18, 19, 36, & 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al in view of Chou et al, and in further view of Reinecke et al.

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20. Applicants' claims are toward a process.

21. Regarding Claims 8, 9, 13, 18, 19, 36, & 37, the combination of Wang et al and Chou et al disclose the process of Claim 1 & 7 respectively, wherein the forming a resist pattern comprises: depositing a plurality of resist layers (See Claims above); and exposing the plurality of resist layers (See claims above) to form a pattern with a predetermined height. The combination does not disclose that the resist layers are exposed at a time with an exposure mask or exposing each of the plurality of resist layers with an exposure mask of the same pattern.

22. Reinecke et al discloses the use of aligned masks during the exposure of a plurality of resist layers (See Column 5 lines 12-27) and the depositing of one of more resist layers after exposing the upper resist layer to create a raised or recessed portion with two or more different heights (See Figures 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Wang et al and Chou et al with Reinecke et al, since Chou et al already discloses that other processing steps such as developing the exposed regions of the plurality of layers may be accomplished at the same time.

23. Additional Disclosures Included: Claim 13: A process of producing a resin molded product having a groove with a width of 2 to 500 μm and an aspect ratio of 1 or more, and a through-hole, comprising: forming a metal structure; and forming a resin molded product, wherein the forming a metal structure comprises: forming a first structure having an uneven surface; forming a resist layer on the uneven surface of the

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first structure; forming a resist pattern by forming a raised or recessed portion of the resist pattern on a raised portion of the uneven surface of the first structure, or by forming a recessed or raised portion of the resist pattern on a recessed portion of the uneven surface of the first structure, wherein the forming a resist pattern includes forming a plurality of resist layers and, after the forming the plurality of the resist layers, developing the plurality of resist layers through solubility control in such a way that an upper resist layer has lower solubility in a developer than a lower resist layer; and forming a second structure by depositing material for forming the second structure on the uneven surface of the first structure where the resist pattern is formed (See Rejections to Wang et al and Chou et al and also Reinecke et al); Claims 18 & 19: Wherein a height of a raised or recessed portion of a resin molded product formed by the forming a resin molded product is substantially 5 μm to 500 μm (See Chou et al; Column 6 lines 19-35 & Reinecke et al Column 9 lines 51-61); Claim 36: Wherein the metal structure used for the forming a resin molded product has an uneven surface used for material processing, and the forming a resist pattern includes developing the lower resist layer exposed with a mask pattern and the upper resist layer exposed with a mask pattern of the plurality of the resist layers, to form a resist pattern having a raised or recessed portion with a plurality of different heights (See Rejections above to Wang et al, Chou et al, and Reinecke et al); and Claim 37: A process according to Claim 1, wherein the metal structure used for the forming a resin molded product has a groove with a width of 2 μm to 500 μm and an aspect ratio of 1 or more, and a through-hole connected to the groove, and the forming the metal structure further comprises:

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forming a first structure having an uneven surface; forming a resist layer of the plurality of resist layers on the uneven surface of the first structure; forming a resist pattern by forming a raised portion of the resist pattern on a raised portion of the uneven surface of the first structure, or by forming a recessed portion of the resist pattern on a recessed portion of the uneven surface of the first structure; and forming a second structure by depositing material for the second structure on the uneven surface of the first structure where the resist pattern is formed (See Wang et al and Chou et al in view of Reinecke et al; Figures 1-6, 8, and 9).

24. Regarding Claim 11, the combination of Wang et al and Chou et al disclose the process, except wherein forming a resist pattern further comprises depositing and exposing one or more resist layers after exposing the upper resist layer, to create a raised or recessed portion with two or more different heights. Reinecke et al discloses this process step. (See Reinecke et al Figure 6 & 9 two different heights are shown)

25. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Wang et al and Chou et al with Reinecke et al to make a textured stamp or mold.

26. Regarding Claim 12, the combination of Wang et al, Chou et al and Reinecke et al discloses the process of producing a resin molded product according to Claim 7, except wherein forming a resist pattern forms a resist pattern having a raised or recessed portion with a plurality of different heights in one development step. It would have been obvious to one of ordinary skill in the art at the time the invention was made

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to modify the process in include the process step of forming a resist pattern forms a resist pattern having a raised or recessed portion with a plurality of different heights in one development step because Reinecke et al discloses that a plurality of masks may be aligned during the exposure step (See Column 5 lines 12-27) and thus be in accordance with Chou et al which discloses that as a means for reducing the number of processing steps the first and second layers are developed concurrently (See Column 5 lines 15-20).

27. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al in view of Chou et al or Wang et al in view of Chou et al and Reinecke et al, in further view of Roach et al (US4308337).

28. Applicant's claim is toward a process.

29. Regarding Claims 14-16, the combination of Wang et al and Chou et al or the combination of Wang et al with Chou et al and Reinecke et al, disclose the process according to Claim 1, 7, & 11 respectively, wherein a light source used for exposure in the forming a resist pattern (See Figures; irradiation exposure). The combination of references, do not disclose that the light source is an ultraviolet lamp or a laser. Chou et al does however, disclose that ultraviolet light is used during the exposure process step (See Column 7 lines 10-15).

30. Roach et al discloses forming a resist pattern wherein a light source is a ultraviolet lamp or laser (See Column 3 lines 19-35).

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31. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of references which disclose using a light source, with the ultraviolet lamp or laser disclose by Roach et al, because Chou et al discloses the use of actinic radiation for developing photoresist layers.

32. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al in view of Chou et al and in further view of Roach et al (US4306013).

33. Applicant's claim is toward a process.

34. Regarding Claim 5, the combination of Wang et al and Chou et al disclose the process of producing a resin molded product according to Claim 1, wherein the forming a resist pattern comprises, before the developing the plurality of resist layers: exposing the lower resist layer; and exposing the upper resist layer (See Rejections above). The combination does not disclose the solubility control comprises exposure control for controlling an amount of exposure of the lower resist layer and the upper resist layer.

35. Roach et al discloses the use of actinic radiation for the exposure of a photoresist. Roach et al also discloses that the solubility control comprises exposure control for controlling an amount of exposure to the photoresist layer (See Table 1).

36. It would have been obvious to one of ordinary skill at the time the invention was made to modify the process of Wang et al and Chou et al with the process of controlling the solubility for the photoresist layer of Roach et al, because Roach et al demonstrates that the exposure time of the photoresist can affect the depth of the photoresist that is to be removed (See Table 1).

Telephonic Inquiries

37. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

38. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **BOBBY RAMDHANIE** whose telephone number is (571)270-3240. The examiner can normally be reached on Mon-Fri 8-5 (Alt Fri off).

40. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

41. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. R./

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797